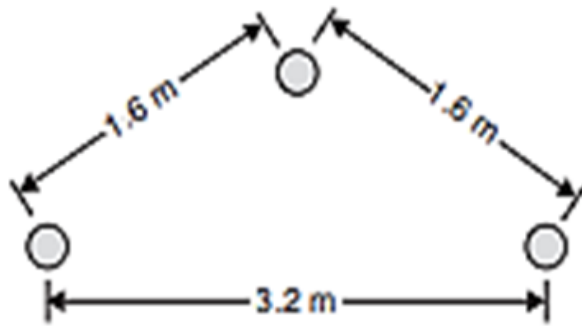


**School of Engineering****B.TECH Electrical Engineering  
Semester End Examination - Jun 2024****Duration : 180 Minutes  
Max Marks : 100****Sem IV - G2UB406T - Fundamentals of Power Systems**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) Name different power system elements and draw the symbols used for single line diagram. K1(2)
- 2) Explain local corona and general corona. K2(4)
- 3) Explain corona phenomenon and critical disruptive voltage. K2(6)
- 4) Find the critical disruptive voltage and the critical voltages for local and general corona on a 3-phase overhead transmission line, consisting of three stranded copper conductors spaced 2.5 m apart at the corners of an equilateral triangle. Air temperature and pressure are 21°C and 73.6 cm Hg respectively. The conductor dia, irregularity factor and surface factors are 10.4 mm, 0.85, 0.7 and 0.8 respectively. K3(9)
- 5) Discuss various components to make use for HVDC system in AC transmission system. K3(9)
- 6) Interpret the affect due to ice and wind loadings on sag .A transmission line conductor having a dia of 19.5 mm weights 0.85 kg/m. The span is 275 metres. The wind pressure is 39 kg/m<sup>2</sup> of projected area with ice coating of 13 mm. The ultimate strength of the conductor is 8000 kg. Calculate the maximum sag if the factor of safety is 2 and ice weighs 910 kg/m<sup>3</sup>. K5(10)
- 7) Distinguish between different types of cables and write the main requirements of insulating materials used for cables. K4(12)
- 8) Determine the ABCD parameters constants, sending end Voltage & current in terms of receiving voltage and current for the transmission line represented by nominal T section. What do you understand by characteristics impedance and propagation constant? K5(15)
- 9) Determine the capacitance of unsymmetrical three phase transmission line and find the capacitance and the charging current K5(15)

per km when the transmission line of operating at 50 Hz and conductors arranged as follows. The conductor diameter is 0.8 cm is operating at 132 kV.



- 10) Derive the expression for inductance of three phase double circuit Transmission line. Determine the inductance per km of a double circuit 3- $\phi$  line as shown in Figure. The self GMD of the conductors is 0.0069.

K6(18)

